Special Issue on Disability, Virtual Reality, ArtAbilitation and Music

Editorial: International Journal on Disability & Human Development

Lewis Brooks, Anthony (aka Tony); Sanchez, Jaime; Sharkey, Paul; Merrick, Joav

Published in:
International Journal on Disability and Human Development

DOI (link to publication from Publisher):
10.1515/IJDHD.2011.016

Publication date:
2011

Document Version
Publisher's PDF, also known as Version of record

Int J Disabil Hum Dev 2011;10(1):xxx–xxx © 2011 by Walter de Gruyter • Berlin • New York. DOI 10.1515/IJDHD.2011.016

Editorial

Disability, virtual reality, art-abilitation and music

Anthony L. Brooks, Jaime Sánchez, Paul Sharkey and Joav Merrick

This special issue features selected papers from the ICDVRAT (International Conference on Disability, Virtual Reality and Associated Technologies) and ArtAbilitation conferences held in Portugal 2008 and Chile 2010. The papers presented in this issue focus on three aspects: the use of creative arts; music and sound through technology; and also on innovations in the field of the visually impaired. The editorial closes with an introduction to a contemporary inter-sensory stimulation concept called 'Interpretations' that targets inclusive access offering appreciation of classical music for all ages, standing, and disability. Interpretations – a showcase closing event of ICDVRAT & ArtAbilitation in 2008 – was held at the architecturally renowned Casa da Música concert hall, itself a cultural icon for the city of Porto, Portugal.

The selected articles are split into three sections, review articles, original articles and case reports.

Review articles

The first article – 'Customising games for non-formal rehabilitation', from the SensoramaLab at Aalborg University, Denmark – reflects on explorations of a wide variety of artificial realities, alternative communication, and arrays of sensor-based perceptual interfaces for human interaction with virtual environments. Various forms of 'gesture-control' for games are explored, and a rapid prototyping approach using various commercial devices and open-source software is detailed. To demonstrate the concept, a simple open-source game is detailed. Control is adaptive to end-user needs, preferences and desires by using different sensors and modalities of influence according to idiosyncratic profiles. Additionally, explorations of an open on-line 3D virtual world where users can socialize, connect and create are reported. Outcomes highlight how the availability of a simple prototyping platform with free games and new interfaces opens the discussion on the design of original rehabilitation and therapeutic applications. Implementation in future healthcare service needs and the use by future generations of collaborative therapist/artist/programmers are predicted.

The second article is from members of the Théâtre Aphasique Montréal in Canada. In the paper 'Aphasic theatre or theatre boosting self-esteem', authors Côté, Getty and Gaulin detail how acquired brain damage patients diagnosed with aphasia rebuild aspects of their lives, especially communication skills and self-esteem, with the help of a dedicated theatre workshops and performances. The work is notable from the positive outcomes achieved by the team.

'Warrior's Journey; a path to healing through narrative exploration', by authors Morie, Haynes and Chance, from the University of Southern California's Institute for Creative Technologies, USA, presents the Coming Home Project. This project is an online, 3D virtual healing space, which explores new ways to reach veterans returning from recent conflicts who are found to have mental health issues and/or difficulty fitting back into their home communities. The project aims to help contribute to a more positive sense of self-esteem, a restructured life narrative, and a feeling of control over the stresses incurred during their service to their country.

The fourth paper is titled 'CaDaReMi: an educational interactive music game' and is based upon tracking end-users' motion, which is synchronized to directly control an avatar. The paper reports on a series of workshops for a wide range of special needs participants, conducted by the authors Gehlhaar and Girão at the spectacular Casa da Música, Porto. The Educational Section of Casa da Música commissioned the room size installation. The educational team was at the time led by author/scientist Rodrigues.

The final article in this section is titled 'Extending body and imagination: moving to move' by Wilde. In this paper, body-worn devices are presented that encourage participants to view and experience their bodies from alternative perspectives. Goals include the provision of a rich playground for self-expression, as well as learning opportunities that the authors believe might be relevant for people with physical challenges and unconventional or altered abilities.

Original articles

The second section begins with 'Making music with images: interactive audiovisual performance systems for the deaf'. Experimental artist/author Grierson from Goldsmiths College, London, UK, describes the technical and aesthetic approach utilised for the development of a freely available interactive audiovisual performance system designed specifically for use by children with multiple learning difficulties, including deafness and autism.

The next article is by Challis, Senior Lecturer in popular music at the Cardiff School of Creative and Cultural Industries, University of Glamorgan. Challis is a musician technologist with a specific interest in HCI that focuses on the

Q1: Please spell out HCI on first usage

accessibility of 'instruments' and 'music performance'. The paper, 'Infrared sound and music controller for users with specific needs', introduces a novel music and sound controller to facilitate complex musical interaction and further informs on the limitations and problems in designing such interfaces for special needs end-users.

A second article involving Girão, Gehlhaar and Rodrigues, also reports on a workshop. In this composition, titled 'SOUND=SPACE opera: choreographying life within an interactive musical environment', they are joined by co-authors Almeida, Rodrigues, Neto and Mónica. The article reports on a 14-week residency at Casa da Música in Porto with special needs end-users that cumulated in public performances showcasing the results.

The next article reports on the cognitive effects of exploring videogames with older people. Author Torres, from the University of Coimbra, Portugal, details how new mental and physical activities such as contemporary video games can be used to decrease the morbidity resulting from bio-psychosocial deficits associated with old age. Effects on self-concept and on the quality of life are investigated.

Also investigating video games and interaction technologies, Smith and Krause from the African Advanced Institute for Information and Communications Technology, South Africa, report on studies that questioned the provision of access to computer games for disabled persons in developing countries through the development of a novel, simple-to-manufacture, and low-cost gaming input device.

'Voice articulatory training with a talking robot for the auditory-impaired' is an original body of work authored by Kitani, Hara, and Sawada, from Kagawa University, Japan. A talking robot that has mechanical organs, replicating those of a human, is used alongside an adaptive learning strategy for auditory feedback control. The robot initially autonomously learns vocalizations and then reproduces the speech articulation from auditory input. Two different training approaches are presented, with some positive initial results from implementation with deaf subjects being reported.

The next contribution is from a Brazilian-based research project that explores the problems related to the understanding of three-dimensional concepts by blind people. Authors C. Kirner, T. Kirner, Wataya and Valente present their study on physical environments and procedures supported by an augmented reality tool that aims to help blind people understand, describe and convert three-dimensional scenes into two-dimensional embossed representations. Results from the study with 10 congenitally blind people on the learning method, and technical aspects, are presented alongside a discussion on future directions to improve the augmented reality application.

The final article in this section is titled 'Augmented reality application for the navigation of people who are blind' by Sánchez and Tadres, from the University of Chile. Audio cues that assist a person who is blind to locate objects and other people is presented. ARTAB is a technological assistant for people who are blind that uses augmented reality to identify a set of objects in an indoor environment. The system presents audio-based representations that allow a user to determine the relative position of an object with relation to a head-worn video-capture device. The design and implementation challenges, with reference to navigation applications, are discussed following user testing.

Case studies

The final section presents two case studies. 'Unintentional intrusive participation in multimedia interactive environments' is the title of the contribution by Williams, a Specific Learning Difficulty Tutor from Torfaen County Borough Council, Wales. He presents data from two independent case studies that highlight how support-staff intervention negates intended interactions in sessions with special needs children. This study adds to an increasing body of research that questions how applied 'power structures' within education can hinder end-user outcome. Whilst such interferences are often well meaning, Williams suggests that a lack of understanding of roles is evident, leading to a lack of consideration of specific end-user needs, preferences and desires. An inability to optimally support the end-user in processes (often hands-off) where most benefit could be gained is reported.

The second selected case study is titled 'Listening to complexity: blind people's learning about gas particles through a sonified model' by Lahav and Levy from Tel-Aviv University/ University of Haifa, Israel. This contribution reports on how the supply of appropriate information through compensatory sensory channels may contribute to science education performance that supports blind students in classroom situations.

Interpretations: closing event of ICDVRAT 2008, Casa da Música, Porto

Closing this editorial is a brief overview of the concept behind the closing event performance of ICDVRAT *with* ArtAbilitation 2008. The concept evolved from research that bridges performance art and empowerment of people with different abilities. 'Interpretations' is the title given to this event that represents the performance art perspective of a body of work titled SoundScapes. In this context, exploration of inter-sensory stimulus and representations that target deaf audience's appreciation of classical music live performance was investigated with *Orquestra Nacional do Porto*, featuring conductor Luis Carvalho. The concept of cross-referencing audience perceived performance motion (conductor and musicians) and performance audition (music) data and resulting visual interpretation of the music and live performance offering stimulation was presented. Core to the sourcing of data is an array of stage hardware that establishes numerous invisible active sensing areas referred to as Virtual Interactive Spaces (VIS). Autonomous information is sensed and then routed to a mixer workstation. Mixing and mapping is improvised to visual representations so that (a) connections and relationships to the

dynamic sourced data is made obvious, (b) a direct and immediate effect is evident that corresponds to the musical output, and (c), a correlated ambience is created as a complementary palate upon which to create and experience the more immediately dynamic interpretations. The conductor's expression is catalytically forever prevalent. The concept was previously commissioned for concerts in Aarhus, Denmark (1999), and Auckland, New Zealand (2002). Further details of this specific event that illustrated the work in progress, can be found in the publication archive of International Conference Series on Disability, Virtual Reality and Associated Technologies (1).

Interpretations 2008 at Casa da Música, Porto. Images by Paul Sharkey.

References

1. Brooks, AL. Interpretations. Proceeding of the 7th International Conference on Disability, Virtual Reality and Associated Technologies with ArtAbilitation, Maia, Portugal, September 8–11. 2008:15–22. Accessed January 13, 2011. URL: http://www.icdvrat.reading.ac.uk/archive.htm.

Associate Professor Anthony L. Brooks,
AD:MT/Medialogy, Aalborg University Esbjerg, Denmark
E-mail: tonybrooks@soundscapes.dk

Professor Jaime Sánchez, PhD
Department of Computer Science/Center for Advanced Research in Education, University of Chile, Santiago, Chile
E-mail: jsanchez@dcc.uchile.cl

Professor Paul Sharkey, BSc(Eng), MA, PhD
Visualisation and Interactive Technology Centre,
School of Systems Engineering, University of Reading, UK
E-mail: p.m.sharkey@reading.ac.uk

Professor Joav Merrick, MD, MMedSci, DMSc
National Institute of Child Health and Human Development, Office of the Medical Director, Health Services, Division for Mental Retardation, Ministry of Social Affairs, Jerusalem and Kentucky Children's Hospital, Department of Pediatrics, University of Kentucky College of Medicine, Lexington, Kentucky, USA
E-mail: jmerrick@zahav.net.il